



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,003	03/02/2004	Yiping Hu	H0004334--1065	4287

128 7590 10/13/2006

HONEYWELL INTERNATIONAL INC.  
101 COLUMBIA ROAD  
P O BOX 2245  
MORRISTOWN, NJ 07962-2245

EXAMINER

AUSTIN, AARON

ART UNIT PAPER NUMBER

1775

DATE MAILED: 10/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/792,003

Applicant(s)

HU ET AL.

Examiner

Aaron S. Austin

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6, 10, 12, 13, 16, 18-31, 34-36, 38-41 and 43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10, 12, 13, 16 and 30 is/are allowed.
- 6) ☒ Claim(s) 1-6, 18-29, 31, 34-36, 38-41 and 43 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4/26/06
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claim 18 is objected to because of the following informalities: the recitation of "wherein M wherein" should read "wherein M". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the spatial placement of the two coating layers. In particular, how is it that the additional coating layer may be formed on the bottom side of the first coating layer and the first coating layer may be "formed on the substrate"? As claimed, the additional layer could prevent formation of the first coating layer "on the substrate" as required by the claim. For purposes of examination, the claim is interpreted as requiring the first coating layer be formed over the substrate such that the additional layer may be formed on either side of the first coating layer.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,444,259 (Subramanian et al.).

Subramanian et al. teach incorporation of a separate barrier layer into the bond coat of a thermal barrier coating for a turbine component by varying material properties across its depth (abstract and column 5, lines 5-8). The first portion 60 of the bond coat layer 56 may be a mixture of MCrAlY with rhenium, tantalum, platinum, or alloys thereof (column 5, lines 8-14). The second portion 62 may include a MCrAlY that does not include platinum (column 5, lines 14-20). More than two such portions may be used (column 5, lines 25-26).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1775

Claims 1-6, 34-36, 38-40, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,475,642 B1 (Zhao et al.) in view of U.S. Patent No. 6,444,259 (Subramanian et al.).

Zhao et al. disclose oxidation-resistant coating compositions formed of an alloy comprising aluminum, tantalum, at least one base metal selected from nickel, cobalt, and iron, at least one precious metal such as platinum, and minor amounts of other elements such as zirconium, hafnium, silicon, and yttrium. Zhao et al. disclose oxidation-resistant alloy coatings for turbine components made from superalloys wherein the alloy coatings contain the same alloying elements as claimed by the applicants with alloy elemental ranges that overlap applicants' claimed alloy elemental range limits. See line 65 in column 1 to line 24 in column 3 and line 35 in column 3 to line 9 in column 9. Further, the thickness of the coating is about 20 to 200 microns (column 8, line 61) or about 75 to 1300 microns for turbine engine components wherein the coating includes a TBC (column 9, lines 5-9). Prior art which teaches a range within, overlapping, or touching the claimed range anticipates if the prior art range discloses the claimed range with sufficient specificity. See MPEP 2131.03 and Ex parte Lee, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993). The Examiner notes that Zhao et al. mention that the oxidation-resistant alloy coatings can be used for protecting turbine engine airfoil components, and those components are expected to have the same structural features (for example, an airfoil having a concave face and a convex face) as claimed by the applicants. Further, Zhao et al. describe examination of the resultant coating using x-ray techniques (column 5, line 34).

Art Unit: 1775

Please note, the ranges disclosed by Zhao et al. includes Al at a concentration of 30-55 atom % range which is equivalent to 15-35.5 weight % range (column 3, line 15). Further, the alloy taught includes mixtures of precious metals that include four members of Pt, Hf, Si, Zr, Ta, Re, and Ru (column 4, lines 10-13).

Zhao et al. do not teach multiple layered MCrAlYX coatings wherein one layer includes platinum and another does not include platinum.

Subramanian et al. teach incorporation of a separate barrier layer into the bond coat of a thermal barrier coating for a turbine component by varying material properties across its depth (abstract and column 5, lines 5-8). The first portion 60 of the bond coat layer 56 may be a mixture of MCrAlY with rhenium, tantalum, platinum, or alloys thereof (column 5, lines 8-14). The second portion 62 may include a MCrAlY that does not include platinum (column 5, lines 14-20). More than two such portions may be used (column 5, lines 25-26). Therefore, as Subramanian et al. clearly teach multiple layered MCrAlY coatings wherein one layer includes platinum and another does not include platinum provides the advantage of incorporation of barrier layer properties into a bond coat, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form the platinum including MCrAlY layer of Zhao et al. with an MCrAlY layer that does not include platinum as taught by Subramanian et al. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Art Unit: 1775

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,475,642 B1 (Zhao et al.) in view of U.S. Patent No. 6,444,259 (Subramanian et al.), and further in view of U.S. Patent No. 6,264,039 (Chyi).

Zhao et al. in view of Subramanian et al. teach oxidation-resistant coating compositions as described above.

Zhao et al. do not specifically teach the presence of rhenium in the coating, although they do teach the alloys as containing at least one precious metal, which often provides greater oxidation resistance for the coating, in a range of 1 atom % to about 30 atom % (column 4, lines 10-12 and 23-24).

Chyi teaches rhenium is a precious metal having oxidation resistance useful for high temperature applications (column 7, lines 20-26). Therefore, as Chyi clearly teaches rhenium is a precious metal and provides the advantage of use for high temperature applications due to oxidation resistance, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use rhenium as the precious metal taught by Zhao et al. as providing oxidation resistance for the coating. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Claims 18-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,554,837 (Goodwater et al.) in view of U.S. Patent No. 6,475,642 B1 (Zhao et al.).

Goodwater et al. teach a method for applying a nickel and/or cobalt based superalloy, such as a MCrAlY family alloy, to a jet engine component. The method includes bonding the alloy to a jet engine component surface through laser powder welding. See column 1, lines 39-45. Bonding occurs following heating of the weld area using the laser and a powder alloy feed. A control means controls the laser, powder feed and motion through use of a vision system that digitizes the weld area or article providing a path for the laser welding to follow. See column 2, lines 1-8. Once welded, grinding may be required to remove excess weldment from the component and achieve a preferred dimension. See column 4, lines 54-56. The laser used may be any known in the art, specifically including CO<sub>2</sub> lasers. The powder feed operates at a rate of 5 to 15 grams/min. See column 5, lines 4-12.

Goodwater et al. do not teach the MCrAlYX alloy as claimed.

Zhao et al. teach oxidation-resistant coating compositions and method of production of the same as discussed above. Therefore, as it is clearly taught by Zhao et al. that oxidation resistance can be increased by including a MCrAlYX coating as claimed, it would have been obvious to one of ordinary skill in the art to use the composition taught by Zhao et al. as the MCrAlY alloy applied in the method taught by Goodwater et al. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Art Unit: 1775

Regarding claims 25, the cited prior art discloses the claimed invention except for the duplication of layers of MCrAlY. It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply more than one MCrAlY layer, since it has been held that mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claims 26 and 27, Goodwater et al. do not teach a specific range for power of a laser. However, an example is given with use of a CO<sub>2</sub> laser operated at 2.6 to 2.8 kilowatts. It would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the lasers power for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Further, the ranges in the example are substantially close to that of the instant claims, particularly claim 26, such that one of ordinary skill would have expected compositions that are in such close proportions to those in prior art to be prima facie obvious, and to have same properties. *Titanium Metals Corp.*, 227 USPQ 773 (CA FC 1985).

### ***Allowable Subject Matter***

Claims 10, 12, 13, 16 and 30 are allowed.

### ***Response to Arguments***

Applicant's arguments, see the Remarks/Arguments, filed on February 2, 2006, with respect to the rejection of claims 12 to 13 over the combination of WO '819 in view

Art Unit: 1775

of Zhao and Lugscheider as well as with respect to claims 10 and 16 over the combination of WO '819 in view of Zhao have been fully considered and are persuasive. In particular, the argument that it would not be obvious to combine the references is found persuasive. Therefore, the rejections have been withdrawn.

Regarding the double patenting rejection, the rejection is withdrawn as the opposing claims have been cancelled in the opposing case.

Regarding Zhao et al., Applicant argues Zhao et al. do not include multiple layered MCrAlYX coatings wherein one layer includes platinum and another does not. The above arguments address these new limitations. Further, Applicant argues Zhao et al. does not teach inclusion of rhenium in the amounts claimed. On the contrary, they do teach the alloys as containing at least one precious metal, which often provides greater oxidation resistance for the coating, in a range of 1 atom % to about 30 atom % (column 4, lines 10-12 and 23-24). As evidenced by the Chyi reference, rhenium is a precious metal within the teachings of Zhao et al.

Regarding Goodwater, Applicant argues there is no motivation to combine Goodwater and Zhao et al. as Goodwater does not teach application of a modified MCrAlYX layer. It is the Examiner's position that a person knowledgeable in the art will recognize an MCrAlYX coating is a subspecies of MCrAlY coatings and thus methods for application of an MCrAlY coating apply to MCrAlYX coatings as well.

Regarding Guo, the arguments are persuasive and the previous rejections based upon Guo are withdrawn.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In particular, JP406220603A teaches a blade surface alternately with a MCrAlY layer over which a MCrAlY layer containing platinum is applied followed by another MCrAlY layer. Further, U.S. Patent No. 5,942,337 (Rickerby et al.) teaches a multi-layer thermal barrier coating with a MCrAlY layer over which a MCrAlY layer containing platinum is applied.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron S. Austin whose telephone number is (571) 272-8935. The examiner can normally be reached on Monday-Friday: 7:30 AM to 4:00 PM.

Art Unit: 1775

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ASA

  
JENNIFER C. MCNEIL  
SUPERVISORY PATENT EXAMINER  
9/29/06